

# Synthetic Data Pipeline for Pose Estimation (Milestone 2)

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# Overview of Milestone 2

- Figuring out different systems of movement
- Implementing movement and lighting
- Adding background
- Creating and implementing configuration file
- Extracting pose information from each frame

# Milestone 2 Matrix

Task	Completion %	William	Nate	Stephane	Hani bal	To do
Incorporate Movement	75%	37%	0%	38%	0%	Add more complex path options
Add Background	100%	95%	0%	0%	5%	Correct location on camera and add to config file
Configuration file	75%	0%	75%	0%	0%	Addition of movement options
Lighting	100%	75%	25%	0%	0%	Test reflections
Pose Information for each frame	100%	80%	0%	20%	0%	
Investigate Nvidia Omniverse	0%	0%	0%	0%	0%	Scrapped

# Running

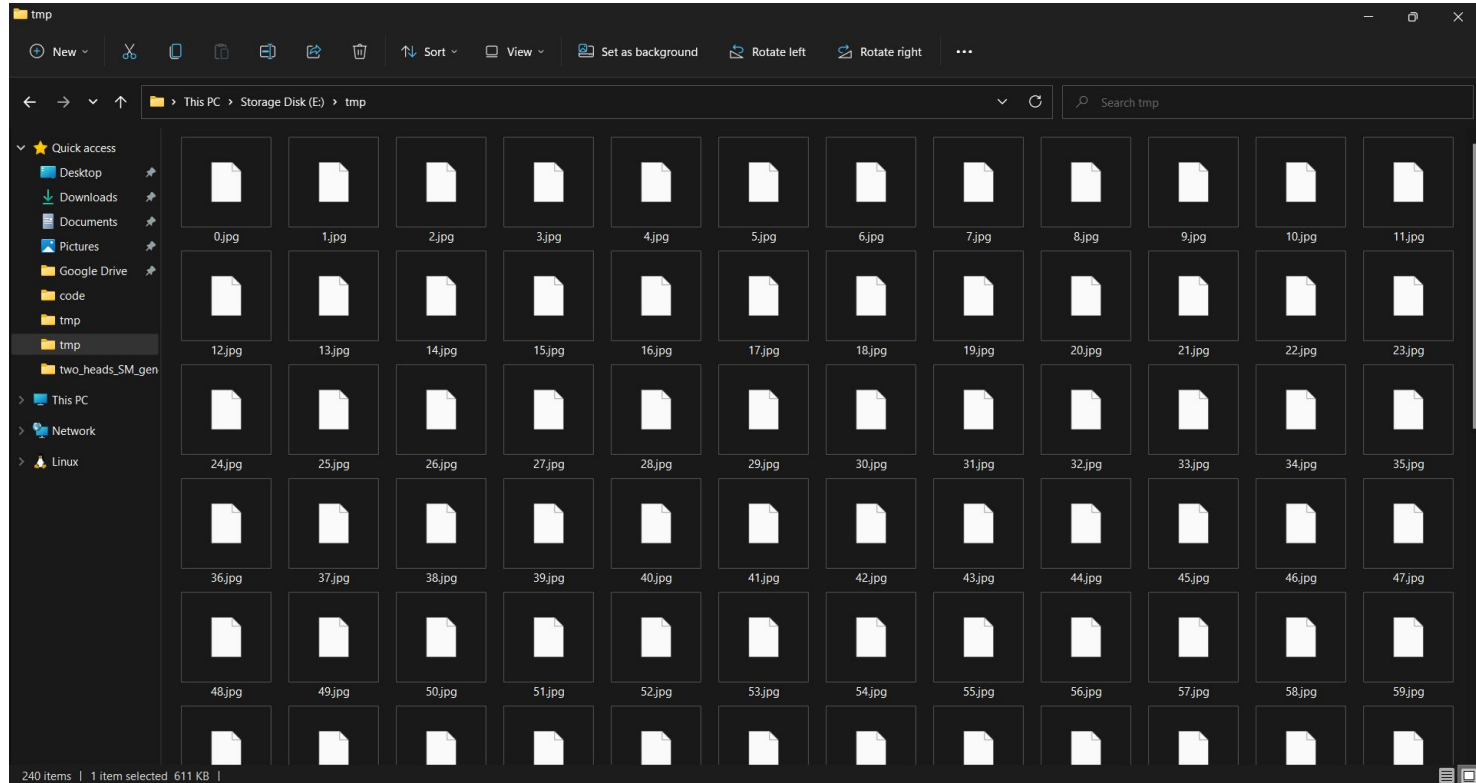
```
PS C:\> cd .\Users\sfern\Documents\college\senior_proj\datapipeline4101\  
PS C:\Users\sfern\Documents\college\senior_proj\datapipeline4101> blender -b --python .\code\mileston2_demo.py
```

# Running

```
Fra:2 Mem:154.07M (Peak 154.07M) | Time:00:00.99 | Compositing | Tile 26-40
Fra:2 Mem:154.07M (Peak 154.07M) | Time:00:00.99 | Compositing | Tile 27-40
Fra:2 Mem:154.07M (Peak 154.07M) | Time:00:00.99 | Compositing | Tile 28-40
Fra:2 Mem:154.07M (Peak 154.07M) | Time:00:00.99 | Compositing | Tile 29-40
Fra:2 Mem:154.07M (Peak 154.07M) | Time:00:01.00 | Compositing | Tile 30-40
Fra:2 Mem:154.07M (Peak 154.07M) | Time:00:01.00 | Compositing | Tile 31-40
Fra:2 Mem:154.07M (Peak 154.07M) | Time:00:01.00 | Compositing | Tile 32-40
Fra:2 Mem:154.07M (Peak 154.07M) | Time:00:01.00 | Compositing | Tile 33-40
Fra:2 Mem:154.07M (Peak 154.07M) | Time:00:01.00 | Compositing | Tile 34-40
Fra:2 Mem:154.07M (Peak 154.07M) | Time:00:01.00 | Compositing | Tile 35-40
Fra:2 Mem:154.07M (Peak 154.07M) | Time:00:01.01 | Compositing | Tile 36-40
Fra:2 Mem:154.07M (Peak 154.07M) | Time:00:01.01 | Compositing | Tile 37-40
Fra:2 Mem:154.07M (Peak 154.07M) | Time:00:01.01 | Compositing | Tile 38-40
Fra:2 Mem:154.07M (Peak 154.07M) | Time:00:01.01 | Compositing | Tile 39-40
Fra:2 Mem:154.07M (Peak 154.07M) | Time:00:01.02 | Compositing | Tile 40-40
Fra:2 Mem:154.01M (Peak 154.07M) | Time:00:01.03 | Compositing | De-initializing execution
Saved: 'E:\tmp\2.jpg'
Time: 00:01.14 (Saving: 00:00.11)

Fra:3 Mem:114.89M (Peak 114.89M) | Time:00:00.04 | Syncing _root_Cube_004
Fra:3 Mem:114.89M (Peak 114.97M) | Time:00:00.04 | Syncing shiny_panel_Default_005
Fra:3 Mem:115.03M (Peak 115.14M) | Time:00:00.05 | Syncing foil_silver_Default_001
Fra:3 Mem:115.81M (Peak 116.83M) | Time:00:00.05 | Syncing foil_gold_Default_002
Fra:3 Mem:116.38M (Peak 116.88M) | Time:00:00.05 | Syncing black_krinkle_Default_008
Fra:3 Mem:116.39M (Peak 116.88M) | Time:00:00.05 | Syncing gold_2_Default_000
Fra:3 Mem:118.94M (Peak 120.14M) | Time:00:00.06 | Syncing tex_01_Default_006
Fra:3 Mem:120.74M (Peak 122.68M) | Time:00:00.07 | Syncing my-light
Fra:3 Mem:120.74M (Peak 122.68M) | Time:00:00.07 | Syncing Camera 1
Fra:3 Mem:118.54M (Peak 122.68M) | Time:00:00.07 | Rendering 1 / 64 samples
```

# Output



# Demo Video



# Configuration File

```
1  [lighting]
2  # Lighting type "point" or "sun"
3  light_type = "POINT"
4  # Location of point source
5  light_x = 0
6  light_y = 0
7  light_z = 0
8  # Strength of light source
9  light_wattage = 10000
10
11 [satellite]
12 #path to satellite inside file
13 satellite_file= "/aqua/nasa-aqua-satellite.obj"
14
15 [background]
16 #path to satellite inside file
17 background_file= "/space.png"
```



# Quaternions

- Quaternions are a number system extending the complex numbers
- Represented as (X, Y, Z, W)
- X,Y,Z represent the axis of which the rotation takes place
- W represents the angle of rotation where  $W = \cos(\theta/2)$

```
120
0.2230796217918396 -0.431097149848938 0.8506507277488708 -0.2019512802362442
121
0.211519222643184662 -0.43434616923332214 0.8458941578865051 -0.22597795724868774
122
0.1996668130159378 -0.4379829168319702 0.8401929140090942 -0.24975994229316711
123
0.18750619888305664 -0.44201070070266724 0.833561360836029 -0.27320945262908936
124
0.17502059042453766 -0.4464287757873535 0.8260211944580078 -0.296239972114563
125
0.16219161450862885 -0.4512326419353485 0.8176003694534302 -0.31876733899116516
126
0.14899957180023193 -0.45641329884529114 0.8083334565162659 -0.34070974588394165
```

## Milestone 3 Goals

- Allow the use of mathematical functions for movement
- Implement compatibility among operating systems
- Test and create demos for each addition individually
- Expand use of configuration file
- Output pose information in COCO dataset format



# Milestone 3 Matrix

Task	William	Nate	Stephane	Hanibal
1. Complex movement along path	develope	demo	test	test
2. Enable movement interaction through configuration file	test	develope	demo	develope
3. Implement compatibility among os	demo	test	develop	test
4. Extract poses as coco type annotations	Dev	Test	demo	test

Questions?